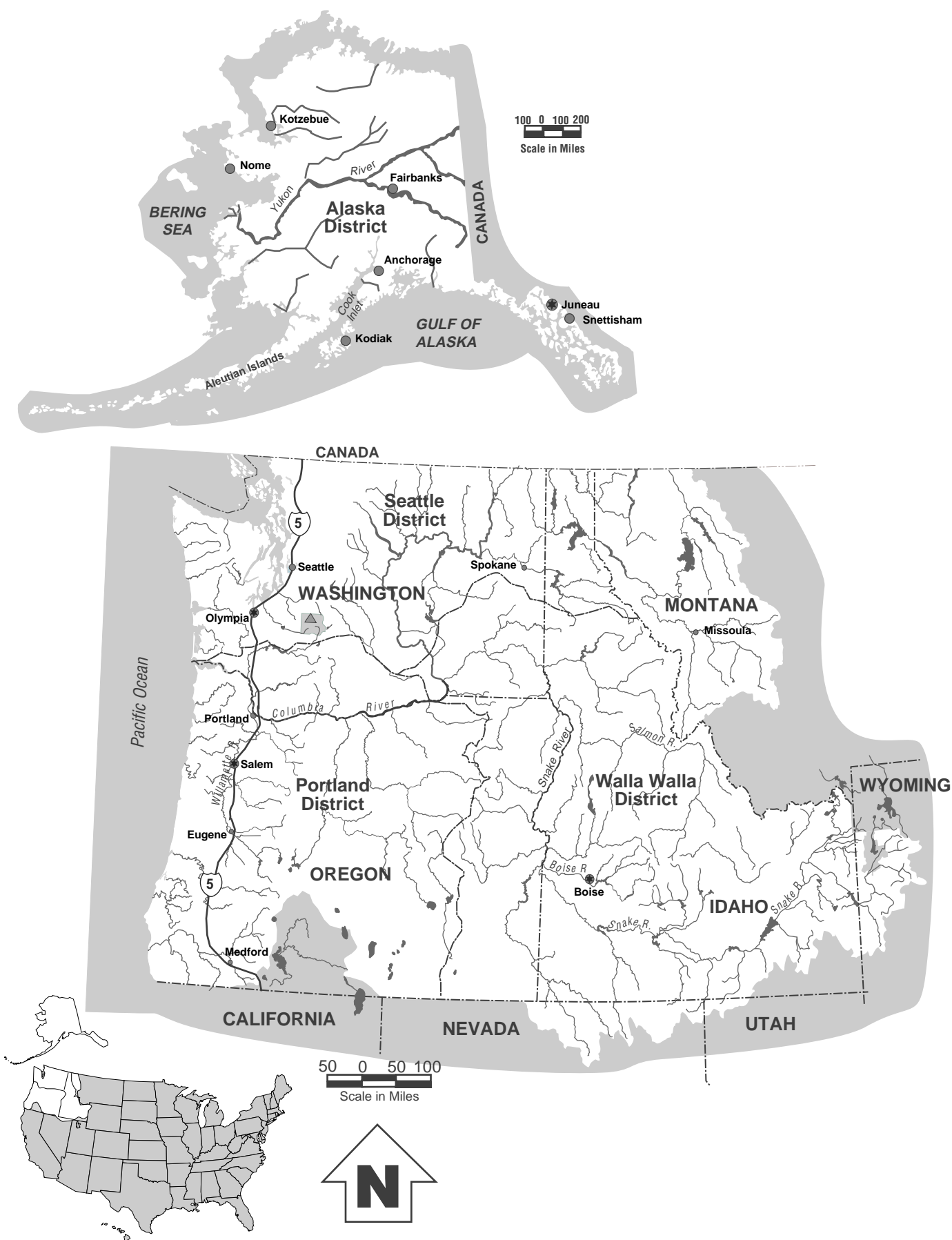


# North Pacific Division





## North Pacific Division

The U.S. Army Corps of Engineers has 12 regional offices, called divisions, throughout the United States. These divisions manage Corps civil works activities accomplished by districts which are based on river basins rather than state boundaries.

The North Pacific Division in Portland, Oregon, directs the civil works activities of four district offices in the Pacific Northwest and Alaska. The area of responsibility of the three district offices located in Portland, Oregon, and in Seattle and Walla Walla, Washington, includes all or portions of the seven western states located in the Columbia River Basin. The fourth district office at Anchorage, Alaska, has civil works responsibility for that entire state.

With an area of 880,000 square miles, the North Pacific Division encompasses nearly one-fourth the total land area of the United States. With the vast stretches of Alaskan shoreline, added to that of Washington and Oregon, the North Pacific Division includes more than 60 percent of the country's tidal coastline. Though vast in size, the region's population represents about five percent of the national total.

The North Pacific Division headquarters provides guidance, oversight and assistance to its districts to assure that the various water resources missions are accomplished in the federal interest and to the satisfaction of customers. The Division headquarters also performs a major regional interface role with federal, state and local governmental interests in the coordination of technical, policy and budgetary matters affecting the water resources of the Pacific Northwest and Alaska.

## Technical Support Services

### Water Management Division

The Water Management Division is responsible for managing the system of Corps reservoirs in the Columbia River basin. This is accomplished through developing, coordinating and implementing reservoir operation plans which balance the competing demands for water in the basin. Because of the interconnection with many non-Corps projects, this effort also encompasses both federal and non-federal reservoirs in the basin owned and operated by various interests. Altogether, some 75 projects are involved.

The Reservoir Control Center in the Water Management Division manages the day-to-day regulation of the projects for flood control, navigation, power generation, recreation, fish and wildlife, and other purposes. Utilizing weather, streamflow and project data, along with forecasts of future streamflow and operational conditions, the Reservoir Control Center develops regulation strategies for the system based on operating plans, then issues operating instructions to the operators of the dams. Close coordination with agencies and individuals affected by any operation is important to ensure that the best interests of the public are being served. The center also requests releases from the Canadian reservoirs under the terms of the Columbia River Treaty, discussed later in this section.

Other units in the Water Management Division have specialties in hydropower planning, hydropower economics,

flood control, water quality and river forecasting. They prepare studies that establish long-term operating plans and reservoir operating criteria, and make analyses to address operating concerns such as fishery survival and mitigation. As with the day-to-day operations, extensive coordination is also required for long-term planning. This includes the northwest electrical utility industry, environmental agencies, and other water resource agencies, often through established regional coordinating entities such as the Northwest Power Pool, the Pacific Northwest Coordination Agreement, the Columbia River Treaty, and the Columbia River Water Management Group.

Another important Water Management function is chairing the In-Season Technical Management Team (TMT), an adaptive management approach to implementing special federal Columbia/Snake river system operations during the juvenile salmon out-migration. The TMT is composed of federal managers from the National Marine Fisheries Service, the Bureau of Reclamation, Bonneville Power Administration, U. S. Fish and Wildlife Service and the Corps. It meets at least weekly during the migration season and provides a forum to receive recommendations from the federal fisheries agencies as well as state and tribal fishery interests.

Still another function occurs during periods of high runoff, during which the Water Management Division ensures that the Corps responsibilities for flood control in the basin are being met. It also works with the Bonneville Power Administration to manage the system to maximize production of hydroelectric power for the region and, when possible, for export to other regions in the west. When low runoff occurs, the Water Management Division's work is often more critical since a careful balancing of all water uses is needed to minimize adverse impacts associated with drought conditions.

## Materials Laboratory

The Materials Laboratory, 15 miles east of Portland, at Troutdale, Oregon, provides testing services for Corps investigations, design and construction. Since it began testing in 1948, the laboratory has performed studies on more than 50 major dams and powerhouses.

Three departments conduct tests on soil, rock, concrete, paint, oil, asphalt, and other construction materials. They also provide technical advice on construction material used for both civil and military projects. The laboratory performs quality analyses for potable water, pollution surveillance in rivers and reservoirs, and EPA quality assurance programs for chemical water analysis.

The laboratory not only performs testing for districts within the North Pacific Division, but also works for other government organizations and, when commercial facilities are not available, for private firms.

## Hydroelectric Design Center

The Hydroelectric Design Center began with the design of the first powerhouse at Bonneville Dam. The initial units there started generating power in June 1938. With the

forecast for development of the Columbia River Basin and the consequent number of powerhouses to be designed, hydroelectric design for the North Pacific Division was centralized in the Hydroelectric Design Branch in 1948. The Center has since designed 32 major powerhouses.

As part of a centralized design concept, the Chief of Engineers established the North Pacific Division's Hydroelectric Design Center as the sole center of expertise for the Corps of Engineers in 1993. In addition, the HDC also is responsible for the design of large pumping stations.

The Center's personnel perform structural, electrical and mechanical design for hydroelectric powerhouses, equipment procurement and preparation of construction plans and specifications. Today, the bulk of their work goes towards modernization and rehabilitation of the Corps aging hydroelectric facilities.

## Regional Issues

### Comprehensive Basin Studies

The North Pacific Division is responsible for directing and overseeing basinwide comprehensive studies undertaken by the Corps in the Pacific Northwest and Alaska. The Division office also coordinates Corps input and involvement in interagency studies under the direction of other agencies or states. At present, the most significant comprehensive basinwide study is the System Operation Review (SOR).

As one of the most highly developed and complex river systems in the world, the Columbia River System serves a broad spectrum of users. Through the SOR, the Corps, Bureau of Reclamation and Bonneville Power Administration have evaluated this system of federal projects — many of which were authorized or constructed 20 or more years ago — to determine how best to meet today's needs and provide a long-term strategy for system operation.

The study team has produced an Environmental Impact Statement (EIS) of the expected effects of alternative operation regimes for the federal hydropower system on all uses. Several system operating strategies in the SOR focus on anadromous fish recovery.

SOR goals are to provide:

- A comprehensive review of Columbia River System operations, including 14 major federal projects on the Columbia and its major tributaries,
- Review of current system operations,
- A strategy for future operations in view of the needs of all users, and
- Support for a future federal decision on key power agreements — the Pacific Northwest Coordination Agreement and the Canadian Entitlement Allocation Agreements.

Early in the SOR, Endangered Species Act petitions and listings of endangered and threatened salmon species influenced the scope and direction of the review. The



preferred system operation strategy alternative mirrors recommendations of the National Marine Fisheries Service and the Fish and Wildlife Service in their biological opinions on salmon recovery plans.

## **Columbia River Treaty with Canada**

The Columbia River Basin spans the boundaries between the United States and Canada. To address jurisdictional and operating problems, the United States and Canada signed the Columbia River Treaty in 1961. It was ratified three years later. The pact provided for the construction of three dams in Canada — Mica, Hugh Keenleyside and Duncan — and for the U. S. to construct Libby Dam on the Kootenai River, in Montana. The treaty provides that 15.5 million acre-feet of storage space be allocated for power production and 8.45 million acre-feet reserved for flood control storage in Canadian reservoirs.

The Treaty ensures Canada will operate storage features to provide downstream flood control and optimum power generation in the Basin. Libby's reservoir, Lake Koocanusa, extends 42 miles into British Columbia. Canada assumed all costs of construction and operation of that part of the reservoir. All four of the projects under the Treaty are constructed and in operation.

In return for constructing and operating the three Canadian projects, Canada was paid a one-time lump sum payment of \$64.4 million for 50 percent of the flood damages prevented in the United States during the 60-year life of the treaty. This included money for flood control services to the United States. Canada also receives one-half of the power produced downstream as a result of the added Canadian storage.

Canada sold its share of this power to the United States for \$254 million for a 30-year period. The Columbia Storage Power Exchange (CSPE), a non-profit U.S. corporation, was established for the purchase. Power is divided among 41 public and private utilities. Participants' shares range from 0.5 to 17.5 percent.

These power allocation agreements phase out in stages from 1998 through 2003. After 2003, the United States is obligated to deliver this power to Canada.

The Bonneville Power Administrator and the North Pacific Division Engineer are designated by Presidential Executive Order as the United States operating entity. The British Columbia Hydro and Power Authority acts as the Canadian operating entity. Both have established operating and hydrometeorological committees to develop and implement operating plans for Canadian storage and to collect real-time hydromet data needed to operate the system.

## **Northwest Power Planning Council**

In December 1980, Congress passed the Pacific Northwest Electric Power Planning and Conservation Act which established the Northwest Power Planning Council. The Council is composed of two members each from Idaho, Montana, Oregon and Washington, appointed by governors, charged with preparing and adopting a regional

conservation and electric power plan. The Council's charter also puts fish and wildlife considerations on an equitable basis with power planning and other purposes for which hydroelectric facilities were developed.

In December 1994, the Council passed amendments to its Fish and Wildlife Plan which called upon the region to implement certain actions for Columbia and Snake River salmon. The amendments, called the Strategy for Salmon, laid out a number of actions for the Corps, including operational changes to the hydro system and physical changes to the dams. Many of these actions also appeared in a Biological Opinion issued in March 1995 by the National Marine Fisheries Service under the Endangered Species Act concerning listed Snake River salmon species. The Corps, while attempting to respond to Council plans, has a legal mandate to fulfill Endangered Species Act requirements, and has placed higher priority on the measures contained in the Biological Opinion.

## **Anadromous Fish**

The Columbia River Basin provides habitat for five species of anadromous salmon and for steelhead. Anadromous fish hatch in fresh water rivers and tributaries, migrate to and mature in the ocean, and return to their place of origin as adults to spawn. Salmon generally live two to three years in the ocean before returning to spawning areas.

A number of factors have contributed to the current depressed state of salmon stocks in the Columbia and Snake River Basin. Adverse effects of dams, logging, mining, cattle grazing and pollution on spawning and rearing habitat; increased competition for food and spread of disease from hatchery stocks; dams that impede the migration of salmon from their upriver rearing areas to the ocean and as they return as adults to spawn; over harvesting — historically in the 1800s and since then by incidental ocean take and sport and commercial fishery in the Basin; poor ocean conditions which have also brought coastal salmon and steelhead stocks to similar levels of decline; all of these have combined to lessen survival chances of the wild salmon stocks.

Despite regional efforts to stop declines in numbers of salmon and steelhead in the Columbia/Snake River Basin,



three species of salmon have been listed under the Endangered Species Act (ESA). Effective December 20, 1991, the National Marine Fisheries Service (NMFS) listed Snake River sockeye salmon as endangered; effective May 22, 1992, Snake River spring/summer and fall chinook salmon were listed as threatened species. In August 1994, NMFS changed the status of the two listed chinook species to endangered, in an emergency action.

The Corps' eight hydroelectric dams on the Columbia and Snake rivers are widely believed to be a major factor in the decline in numbers of wild Snake River salmon stocks. Besides physically impeding fish migration, the dams create reservoirs that alter water velocities and temperatures, interfering with juvenile migration patterns and improving conditions for predators.

Adult fish ladders have been built into each of the eight lower Snake and Columbia river dams. These allow adult fish to follow a series of graduated steps and pools to scale the 100-foot rise in elevation from the tailrace to the forebay of the dams. The ladders have proved effective.

In the years since the dams have been in operation, many improvements have been made to juvenile fish passage routes at the dams. There are a number of ways for juvenile fish to pass the dams: over the spillways, through the juvenile bypass systems, in specially designed barges, and through the turbines.

## Activities for Salmon

Under the ESA, the Corps prepares a biological assessment of the effects on listed species of planned operation of the federal Columbia River power system. Following consultations between NMFS and the Corps, NMFS issues a biological opinion.

In its March 2, 1995 biological opinion for 1995 and future years, NMFS found that the planned operation of the federal Columbia River power system would jeopardize the continued existence of the three listed Snake River salmon species. Accordingly, the biological opinion provided reasonable and prudent alternative measures to avoid jeopardy.

On March 10, 1995, Maj. Gen. Ernest J. Harrell, Division Engineer for North Pacific Division (retired in July 1995), signed a record of decision documenting the Corps intent to implement the measures in the biological opinion.

The biological opinion calls for a variety of actions and studies for improving conditions for salmon migration throughout the Columbia and Snake River system. During the 1995 operating year, the Corps implemented operational measures such as flow augmentation, spills, juvenile fish transport, and lowered reservoir levels, as contained in the biological opinion. A technical management team of representatives from five federal agencies (US Fish & Wildlife Service, NMFS, Bureau of Reclamation, Bonneville Power Administration, and the Corps) monitored river and fish conditions and recommended adjustments to operations during the migration season.

In accordance with the biological opinion, extended submerged screens are being installed in the existing

juvenile bypass systems at Lower Granite and Little Goose Dams on the lower Snake River, to increase the percentage of juvenile fish guided away from the turbine intakes and up through the bypass channels. These are expected to be in place in time for the 1996 juvenile fish migration season. Extended screen installation is planned for McNary Dam by 1997 and at John Day Dam by 1999 (both are on the Columbia River).

Construction of a conventional juvenile bypass system at Ice Harbor Dam on the lower Snake River is scheduled to be completed in 1996. The biological opinion calls for more juvenile fish barges to be constructed, and enlarged exits to be installed on existing barges. PIT (passive integrated transponder) tag monitoring facilities are planned for installation at John Day in 1997 and at Bonneville Dam by 1999.

For the long term, the NMFS biological opinion calls for evaluation and implementation of further improvements to the existing fish bypass systems, as well as study of alternative structural configurations at the dams such as reservoir drawdowns and surface bypass systems. The Corps is evaluating natural river and spillway crest level drawdowns of the four lower Snake River reservoirs — Lower Granite, Little Goose, Lower Monumental and Ice Harbor. The idea behind drawdowns is to increase the velocity of the river by decreasing the cross sectional size of the reservoirs.

Drawdown of the John Day pool to minimum operating level during the juvenile fish migration season, and study of a spillway crest level drawdown at John Day also are requested in the opinion.

Surface bypass is a relatively new technology that holds promise of more efficiently and effectively bypassing juvenile fish at the dams. Surface bypass systems would intercept the fish within the upper portion of the water column, where they normally migrate. There is a potential for reduced spill with these systems. In 1995, the Corps installed and tested several types of guidance systems for surface bypass at Ice Harbor and The Dalles dams. Installation of a prototype surface collector is planned at Lower Granite for 1996.

Other studies focus on improved gas abatement during spill, refined turbine design to reduce turbulence and negative pressures, and light and sound generation, as well as physical barriers, to guide fish.

Research efforts are continuing concurrently, including evaluation of in-river migration versus transport of juvenile fish, study of juvenile fish survival and travel time through the reservoirs, and various aspects of fish behavior.

## Pacific Salmon Coordination Office

To increase the Corps' responsiveness to salmon issues in the region, a Pacific Salmon Coordination Office was established in North Pacific Division in November 1994. The salmon office focuses on internal coordination on salmon issues, as well as improved communication and coordination with regional state and federal agencies, tribes, organizations and the general public.

The office provides oversight and strategic planning of Corps activities to ensure timely completion of actions and studies for salmon restoration.



## Anadromous Fish Evaluation Program (AFEP)

The Corps recently restructured its research program, formerly the Fish Passage Development and Evaluation Program, to assure that salmon studies are fully coordinated internally and with regional entities and programs, including the Pacific Salmon Coordinating Committee (a regional federal agency team), NMFS Biological Opinion, the Northwest Power Planning Council's Fish and Wildlife Program, and the states and tribes. Research focuses on improved fish passage and survival through the dams and reservoirs.

Under the new structure, a Corps AFEP Coordination Team oversees the program and provides command and control, program management, quality assurance and regional interface for all anadromous fish evaluations.

A Technical Coordination Team provides a process for interfacing with federal and state fish agencies, Tribes and other interested parties to assure that they have adequate opportunity for review and to provide recommendations throughout the development and implementation of AFEP studies. The Team will also coordinate scientific peer review of AFEP proposals, test-fish needs, and study results.

### Publication Available

Because of regional interest in actions to aid the migration of salmon and steelhead past the dams operated by the Corps, a publication, *Salmon Passage Notes*, is published several times a year. Individuals who wish to be on the mailing list should write to Editor, **Salmon Passage Notes**, North Pacific Division, U. S. Army Corps of Engineers, P.O. Box 2870, Portland, OR 97208-2870. A limited number of back-issues are available.